

The Amateur in You, Part 2

What have you been pondering?



Why you might want a waterfall display

Many newer HF (and a few VHF) transceivers have recently been developed featuring a very pretty, colorful display known as a *waterfall* (also called a *band scope*). This attractive graphics screen has lured many hams into purchasing one of these beauties, but it's also left some others wondering whether they should "upgrade" to one, in case they're missing out on something cool or useful.

the taller the peaks. Technically, the internal software uses an algorithm called an FFT, or [Fast Fourier Transform](#), to convert the spread of signals from the time domain to the frequency domain, then render the mapped results onto a two-dimensional graphical display. This is the same method for graphically displaying the frequency spread of a spectrum analyzer, for example.



January 2022 in our regular monthly [club meeting](#), Joy Leavitt K7NJP showed us what a waterfall is, how to use it, and probably just as important, *why you would use one*. This short discussion serves as a poor but written summary of Joy's presentation, and focuses on its purpose, but also discusses alternatives to the expensive transceiver for the same light show.

In short, the immediate aim of a waterfall is to graphically display a band, or wide range of frequencies, in real-time. This'll show you immediately what signals are being received on the band by your transceiver without actually tuning to them, the stronger the signals,

But a transceiver waterfall doesn't stop there; instead of only showing the real-time signals across the band, it also displays a brief *history* of the same signals, allowing the past few seconds of signal samples to scroll downward, like water in an actual waterfall, hence the name. The scrolling history displays the signal brighter at the point in the last few seconds when the signal was relatively strong. This way, if you receive a strong signal for only a split second, and then it disappears, the waterfall shows the momentarily strong signal for a few seconds as it scrolls down the display.

The real reason

If you're looking for a contact, or searching for somebody who might be calling CQ on a particular band, and want to answer him, the waterfall can display all the signals your transceiver is detecting on that band. Once you see the modulated RF (radio frequency) signal displayed, you can tune to it right away, instead of manually scrolling through the entire band listening for one.

If you're operating radio for sport, a waterfall can help you increase your QSO count quickly. If you're operating for an emergency, a waterfall can help you locate a life-saving

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continued



contact quickly. And **that** is one of the most important purposes of a waterfall.

By the same measure, a waterfall can display frequencies where a current QSO is taking place, and if you wanted to call out CQ and avoid their conversation, you won't need to guess or accidentally step on their party.

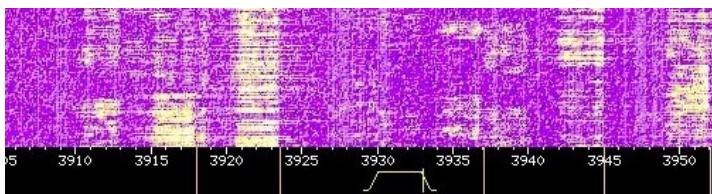
It might take a little experience, but once you're in the digital portion of the bands, it can get difficult to tell PSK31 from FT8 from JT65 from CW. A waterfall can make that a little easier, because each digital mode displays a slightly different signature, which is often easier to pick out on the screen by signal type and bandwidth. This can then help you locate the frequencies of the digital activity of your choice.

Alternatives

You might find that the cost of one of these fancy transceivers exceeds your budget. But, there are other options, some free-of-charge.

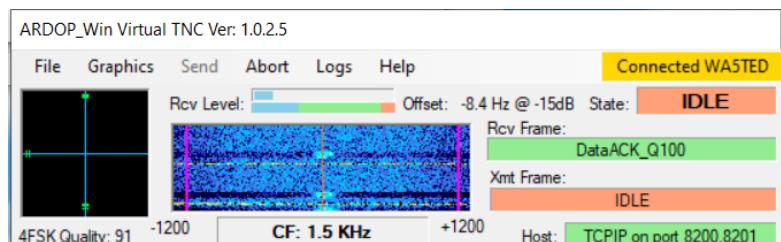
The waterfall display is not confined nor unique to transceivers and analyzers; they are also found online at websites, each known as a *Web SDR* (software-defined radio). One of the most popular is the [Utah Web SDR](#), found on sdrutah.org, which also contains links to other Web SDRs around the country.

A typical Web SDR retrieves the signal data from large receiving antennas erected primarily for that purpose. The data is then posted in real-time to a website, for all to see, and in many cases, control the display parameters.



[Utah Web SDR waterfall on 80 meters](#)

Another option is software used as a desktop or phone app such as [Ham Radio Deluxe](#) or [WSJT-X](#) or [Winlink](#), which includes a waterfall display.



[Winlink waterfall](#)

Yet another is a *panadapter* (short for panoramic adapter), a device you can purchase to connect to your radio and display a waterfall. Many panadapters can display a much larger spectrum bandwidth than is available by a waterfall built into the transceiver.

Finally, a waterfall can give you a near-instant view of whether a band is active at any moment, either by participation or by condition. There are times when you'll be watching a waterfall that displays seven or eight transmissions, which within ten seconds all disappear. If it's not the top of the hour (when nets often conclude), it's possible that band conditions could have abruptly changed for the worse, possibly due to a [solar event](#).

At other times, you might simply enjoy the excitement of seeing so much activity on a band, coupled with the freedom to move from one QSO to another. If you'd like to see a band truly come alive, try viewing a waterfall during a popular contest, such as the [CQ Worldwide DX Contest](#) or the [ARRL Sweepstakes](#), or especially [Field Day!](#)

You can see a [good YouTube video](#) about waterfalls by Dave Casler KE0OG.